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3. The idea of conveying goods and carriages on railways is likely to prevail, the more the subject is considered. In many cases railways are certainly preferable even to canals, and wherever they can be adopted, they are unquestionably better calculated than the common roads, for the conveyance of goods, more especially those of a heavy nature. An idea has occurred, of forming what may be called *stone railways*. Your Committee have thought it right to give a short account of the plan, in the Appendix, with an engraving, to explain one mode by which this may be effected. Any new idea of that sort, thrown out for the consideration of ingenious men, may possibly be improved, so as to turn out of public utility. Probably the mode which has been already adopted, in the commercial road, leading from the West India docks, may be considered as an improvement of this plan; the centre of that road is paved of a convenient breadth for the use of carriages heavily laden, while the lighter carriages, and horses, pass with ease on each side on a road formed in the usual manner.

4. The direction and the forming of roads are also points which merit the attention of parliament. As to the first particular, it is well known that the roads in former times were not conducted in the manner the best calculated for the travelling of carriages heavily laden. Their course was frequently carried up steep ascents, to gain the open country, and avoid the vallies, because the roads through the latter could not easily be made passable in the wet seasons of the year, without a labour and expense which it was perhaps then thought unnecessary to incur, when most, even of the heavy articles of trade, were carried on the backs of horses. Your Committee are of opinion, that by examining the lines of the present roads, much improvement might be effected. Any such alterations must necessarily occasion expense, and may be liable to some objections; at the same time it is well worth the trial, and the first attempt might be made on the great line of road between London and Edinburgh, by which the capitals of the two kingdoms would be more closely connected; and if the advantages were found to be considerable, the same plan might afterwards be extended to other lines. On that subject your Committee beg to refer to a paper which will be found in the Appendix, and which explains the nature of such a plan, and the means of carrying it into effect.

On the whole, your Committee have endeavoured in this Report, and in the Appendix annexed to it, to furnish such information as they trust may be of service, when these particulars come again under the consideration of the House. The points they have alluded to in the Report are of such infinite consequence to the convenience, the comfort, the commercial prosperity, and the personal security of their fellow subjects, that they will feel peculiar satisfaction, if any suggestions, which it has been in their power to collect, shall at all contribute to such important purposes.

BIOGRAPHICAL SKETCHES OF DISTINGUISHED PERSONS.

Historical Eulogium on Joseph Priestley, Read at the public sitting of the National Institute, in the class of mathematical and physical sciences, the 5th of Messidor, year 13 (1806) *by G. Cuvier, perpetual secretary of the first class of the National Institute, and professor of the College of France, and of the Museum of Natural History. Translated by the Rev. D. B. Warden, M. A. and Secretary to the Minister Plenipotentiary of the United States of America. Paris.*

GENTLEMEN,

I HAVE to address you on the subject of the life and works of Doctor Joseph Priestley, an English ecclesiastic, born at Fieldhead, near Bristol

in 1728*, and who died at Philadelphia, in 1804.

On account of his great philosophical discoveries, he was nominated corresponding member of the Academy of Sciences at Paris; and the National Institute was eager to embrace him in the same quality. He belonged also to most other academies of science; and the homage which I now offer him, has perhaps been already bestowed in all great capitals.

This honourable unanimity will give fresh courage to the friends of science: it will exhibit to them in a strong light, the irresistible influence of real merit, when they know that he on whom it is conferred, employed no art, no address, to catch applause; that his whole life was polemical; and that it appeared to be his pleasure to combat the most popular opinions, and to attack the dearest interests of certain classes of men.

It is true, that this excessive ardour in support of his opinions, drew upon him the most implacable hatred. For a long time he was exposed to every species of calumny, and was often the victim of the most atrocious persecution. A populace, maddened by the false reports of his enemies, robbed him, in one day, of the fruits of the industry of half his life; and it was only by expatriation, that he wearied or evaded the animosity of his persecutors. But whilst his fellow citizens appeared to abandon him, strangers hastened to offer him an honourable asylum. And, at this moment, in a country at war with his, the first literary institution of the nation assembles to pay, through me their organ, the last sad tribute which it owes its member. It is in this hall that I observe many of those, whom he has combated, join, in some degree, their voice with mine, to complete his triumphs.

Science and philosophy will have nothing to dread from their blind enemies, as long as a like reward awaits the man who shall have enlarged the noble edifice of knowledge; as long as genius, the friend of humanity, shall know how to extricate itself from the fetters of little local relations;—as long, in fine, as the developement of some new truths will atone for opinions at least extraordinary, and, perhaps dangerous; for, I cannot conceal that those different sorts of opinions are found among those of Priestley.

In effect, his history shows you, in a certain way, two different men, I may say, almost opposite to each other.

The one, a wary philosopher, who examines those objects only which lie within the bounds of his experience, who applies to his procedure the most rigorous logic, who adopts neither system nor prejudice, who seeks truth wherever it may be, and almost always discovers and establishes it in the most solid and brilliant manner.

The other, a rash theologian, who approaches, with boldness, the most mysterious questions, despises the belief of ages, rejects authority the most revered, enters the list with opinions previously conceived, seeks more to raise their importance than to examine them, and embraces, for their support, the most contradictory hypotheses*.

* According to an account of Doctor Priestley's life, written by himself, he was born at Fieldhead, near Leeds, in 1733. E.M.M.

* Whatever may be the sentiments of Bonaparte on the subject of religion, which however seem to have fluctuated according to the various situations in which circumstances have placed him, it is certain that a large proportion of the French nation, throughout all the changes of their revolution, retained a regard for the established form of religion to which they had been accustomed during the old dynasty. To comply either with Bonaparte's real sentiments, or to accommodate his wish to please the French people on this subject, many of the writers and orators have, since his rise to power, promulgated sentiments unfavourable to free discussion on religious subjects. Hence, throughout this oration, an inclination to condemn Dr. Priestley for the freedom of his theological opinions, is apparent. To those who are convinced of the importance of the rights of free discussion, as conducive to the discovery of religious truth, the doctor's laborious investigation, and upright and undisguised avowal of his sentiments, will appear his high praise; and this praise of upright views cannot justly be

The first tranquilly delivers his discoveries to the examination of the learned; they establish themselves without opposition, and procure for him an incontestible glory. The second exhibits himself in a warlike apparel, bristling with erudition and metaphysics, attacking all sects, shaking all dogmas, and revolting all consciences by the ardour which he employs for their subjugation.

It is against the man of heaven—against the minister of peace, they brandish terrestrial arms: it is he whom they accuse of exciting hatred, calling for vengeance, and troubling the peace of society.

The profane philosopher is respected by all. Every one acknowledges that he pretends not to defend truth but by reason, that he employs his discoveries for the use of man, and that his writings indicate mildness and modesty.

Compelled as I am, gentlemen, to unfold to you the whole of Priestley's life, it is necessary that I represent him in these two characters; it is necessary that I speak of him as a metaphysician, theologian, and politician; I shall not mistake, however, that which my functions more particularly demand; I shall not forget the philosopher, the member of the national institute, and that *here* you expect some account of his discoveries.

Besides, it is probable, that in this view, he will most interest Europe and posterity. He has somewhere said, that for a durable reputation, scientific labours are as far above all others, as the laws of nature are above the organization of society; and that none of those statesmen who have ruled in the British cabinet approach the celebrity of a Bacon, a Newton, or a Boyle; a maxim perhaps exaggerated, but fortunate and consoling; for he is not the first celebrated man whose character has been moulded by this idea.

It is here essential to mention, that his divergent opinions had no influence over his conduct; and, if we except the unmerited misfortunes which attacked his old age, the events of his life show nothing but uniformity and simplicity. A list of his works sufficiently indicates the life he led; and when we know, that he is the author of more than a hundred volumes, we may be well convinced that he was not much in the world, and that his history consists of little more than an analysis of his writings.

His father was a manufacturer, and his first preceptor a dissenting clergyman*. After some years of study, he obtained a small employment in the academy of Warrington. He afterwards accepted the office of pastor of a church of dissenters at Leeds, a town not far distant from the place of his birth.

Lord Shelburne, secretary of state, since named Marquis of Landsdown, having heard of his merit, determined to confide to him the education of his oldest son, who is already known by the name of Lord Wycomb, and who has succeeded to the title of his father. After the lapse of seven years he quitted the house of this lord, and

withheld from him by those, who, on such subjects may adopt conclusions widely different from him. In the latter part of his life the doctor reviewed his exertions to discover religious truth, with much complacency, and prized his attainments in this line much higher than his discoveries in chemistry and natural philosophy. It appeared necessary to make these explanatory observations, to show, that in giving this account to the public, we do not concur in the censure cast on him for the freedom of his theological inquiries. B.M.M.

* According to Dr. Priestley's own account, it appears, that after the death of his mother, he was under the care of his aunt, whom he describes as a truly pious and excellent woman. His first preceptor appears to have been a clergyman of the church of England, and afterwards he studied under a dissenting clergyman, till he was removed to the academy of Daventry, in his nineteenth year. He settled first as a preacher at Needham, in Suffolk, and afterwards at Nantwich, in Cheshire. He then went to Warrington, but it was not till after he retired from his situation as tutor in the languages in the academy there, that he resided at Leeds. The French writer has not had accurate information as to several parts of the Doctor's life. B.M.M.

resumed his pastoral functions for the dissenters of Birmingham, among whom he remained eleven years. It was then that he was driven from this town, by that persecution which soon afterwards determined his emigration to the United States. Such is the short and complete summary of his private life: that of his works is more important, and ought to be more ample.

The first were consecrated to education. An English Grammar, his earliest production, is still employed in many of the schools of Britain.

His historical and geographical charts, which unfold to the eye, in a convenient manner, the origin and fall of empire, as well as the period of the life of celebrated men, deserve to be universally known. His lessons on History point out all those views, and that species of information which we ought to possess, to study with advantage the revolution of empires. Those of oratory and criticism pass as fit guides for youth.

It was in the didactic style he wrote his first works on philosophy, his history of electricity, of optics, and his elements of perspective.

The history of electricity had the merit of appearing at that interesting epoch, when Franklin gave to this fine branch of physics its noblest lustre, in its wonderful application to human use: it contained a faithful narrative and analysis of all which was then known on this subject: the work was translated into several languages, and was the means of spreading abroad the reputation of Priestley.

But quitting the ungrateful task of publishing the discoveries of others, he hastened to place himself among the first philosophers.

It is particularly by his discoveries of the diffent kinds of air, that he merits this title; for these have established the most durable monument of his glory.

It had been long known, that several bodies emitted air, and that others, under certain circumstances, absorbed this element. It had been remarked, that the air of privies, of deep wells, and that which escapes from liquors in fermentation, extinguishes flame, and causes animals to perish. A light air was also observed in the interior of mines, which mounts towards the roof of the subterraneous vault, and often enflames with a violent explosion: the first had received the name of *fixed*, the other of *inflammable air*. These are the same which we now call *carbonic acid*, and *hydrogene gas*. Their specific gravities had been determined by *Cavendish*. *Black* had discovered, that it is the fixed air which causes lime and alkalis to effervesce; and *Bergman* soon demonstrated its acid nature. Such was the information on this head when Priestley took possession of the subject, and treated it with unrivalled success.

Residing near a brewery, at Leeds, he had the curiosity to examine the fixed air which exhales from beer in a state of fermentation, its influence on the flame of a candle, and the deleterious power which it exercises over animals.

These experiments having given very remarkable results, he extended the same to inflammable gas.

Desiring afterwards to determine all the circumstances under which these two airs manifest themselves, he soon remarked, that in a great number of combustions, especially in the calcination of metals, air, or its operations, is altered in its nature, without producing either fixed or inflammable air: hence his discovery of a third kind of noxious substance, which he called *phlogistc air*, and which has since been named *azotic gas*.

He employed little animals to try the pernicious action of different kinds of air, and found himself obliged to give torture to those feeling creatures. His character was depicted in the joy he experienced from the discovery of a fourth kind, which obliged him to have recourse to those cruel means; this was *nitrous air*, which has the property of diminishing suddenly the volume of every kind of air with which it mingles, almost in proportion as the other is respirable, and, of consequence, to ascertain to a certain degree the salubrity of different airs.

This discovery, the origin of that branch of physics which is named *eudiometry*, was of the first importance: all the natural sciences were interested in this new acquisition; and

medicine especially would have drawn great advantage from it, if it were not so difficult to introduce a scientific process in the practice of the most scientific arts.

Combustion, fermentation, respiration, putrefaction, produced, sometimes fixed, sometimes inflammable, at others, phlogistic air: there were then an infinite number of causes capable of vitiating the air, and, in the mean while, its purity is not sensibly altered as long as these causes act: there must therefore exist in nature some constant means of re-establishing this purity.

This was found by Priestley in the property which he discovered in vegetables of purifying the atmospheric air during the day by the decomposition of fixed air, a property which is the first key of the whole plan of vegetable economy, and which, joined to that which animals have of spoiling air by respiration, gave a glimpse of what has been since developed, that the springs of life particularly depend upon a perpetual transformation of elastic fluids.

These discoveries of course opened a new field of research concerning living bodies: physiology and medicine were illuminated by an unknown light. New rays still more vivid soon issued from the same focus.

Having applied the heat of a burning glass to an oxyd of mercury, Priestley had the good fortune to obtain, in a pure and isolated state, this respirable portion of air; which animals consume, vegetables restore, and combustion destroys: this he named *dephlogisticated air*.

Others, different from the common air, extinguished light: this made it burn with a sparkling flame, with a prodigious rapidity: others caused animals to perish, in this, without any renovation, they lived longer than in common air, and their faculties appeared to acquire new energy. It was conceived for a moment, that we were in possession of a new means of existence, and perhaps a mode of prolonging life, or at least a sure remedy against most disorders of a pulmonary kind.

This hope has proved deceitful, but nevertheless, dephlogisticated air remains one of the brightest discoveries of the eighteenth century: it is this which, under the name of oxygen, modern chemistry regards as the most universal agent of nature. By it, combustion and calcination operate: it enters into the composition of all acids: it is one of the elements of water, and the great reservoir of fire: it is to this we are indebted for almost all the artificial heat which is procured in the arts and in common life: it is this which, in respiration, gives to our body, as well as to that of animals, its natural heat and the principal material of motion: the energy of different species of animals is in proportion to the force of its action: it is combined with vegetables in every period of their growth, or is disengaged from them in various ways. In a word, physics, chemistry, vegetable and animal physiology, are attended with almost no phenomenon which can be fully explained, without having recourse to this species of air.

This is no more than a light sketch of the most remarkable discoveries of Priestley: time obliges me to overlook a multitude, which would of themselves furnish rich materials for the *eloge* of another. Each of his experiments became either in his own hands or in those of other philosophers, fruitful in luminous consequences; and there are some that have not yet received sufficient attention, and which may one day become the germ of a new order of important truths.

His productions were consequently received with general interest, and were translated in all languages: his experiments were repeated, varied, and commented upon, by the most illustrious philosophers. The Royal Society decreed him, for his first volume, the medal of Copley, which is accorded for the best philosophical work that appears in the course of the year:—a medal of little value, but which England considers as the noblest reward which genius can receive.

The academy of Paris voted him a prize no less noble, and still more difficult to be obtained, because it is more rare,—one of the eight places of foreign members, for which all the learned of Europe struggle, and the list of whom, commencing with the names of Newton, Leibnitz, and

Peter the great, has, in no period, degenerated from its original splendour.

Priestley, covered with glory, is modestly astonished at his own fortune, and at the number of important facts which nature appeared unwilling to reveal, except to him. He forgot that her favours were not gratuitous, and that if she explained herself so well it was because he interrogated her with an indefatigable perseverance, and by a thousand ingenious means allured her to answer. Others carefully conceal what they owe to chance: to this Priestley appears to be willing to ascribe all: he remarks, with singular candour, how often he was aided in this way without perceiving it: how often he was in possession of new substances which he could not distinguish; and never does he dissemble the erroneous views by which he was often directed, and with respect to which he was undeceived by experience alone.

This avowal did honour to his modesty, without disarming jealousy.

Those, whose views and methods never led to any discovery, named him a simple performer of experiments, without order, and without plan: it is not surprising, add they, that in so many trials and combinations, some of them proved fortunate.

But true philosophers were not the dupes of those interested critics. They know how many efforts are necessary for the production of those happy ideas which are the parents and guardians of all the rest; and men, who, after having had the fortune to make great discoveries, have found pleasure in augmenting our admiration by the fine light in which they placed them, can have no bad will towards those, who, like Priestley, have loved more to accelerate our joy, in exhibiting them as they presented themselves and in tracing, with ingenuity, the different windings by which they were conducted to the concealed treasure.

This is pointed out by his manner of writing His book is not a settled construction, a collection of deducible theorems, as might have been conceived by external reason. It is a simple journal of his thoughts in all the disorder of their succession: we there see a man who, at first, gropes about in profound darkness; who spies the smallest glimmering of light; who approaches and examines; whom sudden and deceitful flashes sometimes deceive, but who at last arrives at the most rich and extensive region.

Should we regret if the great masters of the human race, if Archimedes, and Newton, had unfolded, in like manner, the developement of their genius? Newton, being asked how he arrived at such noble discoveries, answered: *it was by long thinking.* What pleasure would it afford to know this long train of thoughts, from which at last originated the sublime idea of Newton, that thought, which is still as it were the soul of all his successors? His writings teach us to admire the powers of nature; but it was only by seeing him in action that we would have truly known the finest of the works of nature—the genius of a great man.

In the mean time, we are not to believe that the discoveries of Priestley were all felt by him, nor that he could expose them in his writings as they are now distinguished and illustrated. When they were performed he knew no other chemical theory than that of Stahl, and this, established upon experiments in which the airs were not considered, could not embrace them, and still less foresee their phenomena. Hence a sort of hesitation in his principles, a sort of embarrassment and uncertainty in his results; seeking every where phlogiston, he is obliged to suppose it to exist in some inconceivable way—in fixed air, heavy and acid; in inflammable air, light; or in phlogistic air, without any of its qualities in the other two. There are cases when an accumulation of phlogiston diminishes the weight of the combination, and then communicates an absolute lightness to the mixtures in which it enters; in others it produces the contrary effect: nothing appears uniform, and no general or precise conclusion is found.

It was necessary that modern chemistry should draw this conclusion, and for that she has only need of one or two formulas:—*Phlogiston does not exist; pure air is a simple substance: so is phlogistic, and inflammable air; combustion is nothing else than the combination of pure air with the*

body. Those few expressions, like the sublime words recorded in genesis, have cleared and disentangled all; chaos is arranged; each part has found its place; and the whole forms a most magnificent picture.

But, like the gods of the Pagans, this chemistry could create nothing from nothing; matter was necessary—a subject for its disposition, and this has been particularly furnished by Priestley.

Under this view he has then every right to be considered as one of the fathers of modern chemistry, and his glory is justly associated with the celebrated revolution in the system of human knowledge.

But he is a father who was never willing to acknowledge his daughter.

His perseverance in defence of his first ideas was unexampled.

He saw, without being shaken, their ablest defenders pass over successively to the standard of the enemy; and, when Kirwan had, almost last of all, abjured phlogiston, Priestley stood alone on the field of battle, and offered a new challenge, in a memoir addressed to the principal French chemists.

By a happy chance, the challenge was accepted, and on the field itself Mr. Adet, then Ambassador of France, in the United States, was also found a worthy representative of French chemistry, and replied to the new arguments raised against it. Almost all came from Priestley—so ingenious, and so adroit in every part of his transcendent system, of which he was the creator, because he was so little acquainted with the processes of modern chemistry. He took, for example, of fixed air, substances into which he suspected it did not enter, and afterwards denied that it always owes its existence to *carbon*. When he formed water of oxygen and hydrogen, he always found a small quantity of nitrous acid, and was unwilling to recognise the portion of azot by which it was produced.

His new publications did not bring back to his opinion those by whom it had been abandoned.

He felt, like many other men, who have endeavoured to fix the impressions made by themselves, that when ideas find a place in the mind, they resemble those seeds whose product depends on the laws of nature, and not upon the will of those by whom they have been sown. To which we may add, that when once they have taken root, no human power is able to eradicate them.

I am now, Gentlemen, arrived at the painful part of my task. You have seen Priestley march with astonishing success in the study of human knowledge to which he consecrated only some moments of leisure.

I am now to present him in another career; struggling against the nature of things, the first principles of which are concealed by a veil impenetrable to human reason; seeking to submit the world to his conjectures, consuming almost all his life in useless efforts, and at last precipitating himself in an abyss of misery.

Here, like him, I have need of all your indulgence. Perhaps the details into which I am now to enter, will appear to some a little foreign to the place in which I speak; but I conceive, that here particularly, the awful example they represent, ought to excite no small degree of interest.

I have already told you that Priestley was an ecclesiastic. I must add, that he passed successively through three religions before he determined to teach any.

Educated in all the severity of the presbyterian communion, which we name calvanist, whether he thought that he found too much to believe, or whether, from that period, he was determined to give a rigorous account of his creed, in his twentieth year he enlisted with the Arians, who, after having almost invaded Christendom, in the time of the successors of Constantine, have now no asylum but in England, and there decorated with the names of Milton, of Clarke, of Locke, and, as some say, of Newton; in modern times, they are in a certain degree indemnified for the loss of their ancient dominion.

Arianism, in declaring Christ a creature, thinks him nevertheless a being of a superior nature, produced before the world, and the organ of the creator in the production of other beings. This is the doctrine which is clothed with the sublime poetry of the

Paradise Lost. Priestley, after having long professed, at last abandoned it, to become a Unitarian, or what among us is called a Socinian.

Perhaps there are few of those who listen to me, who are informed of the difference between these two sects: it consists in this—the Socinians deny the pre-existence of Christ, and regard him as a man only, although they revere him as the Saviour of the world.

This nice shade between two heresies occupied, for thirty years, a head which had resolved the most important questions of science, and stimulated Priestley to write more volumes than he published on the different species of air.

His system is, that the primitive church was at first Unitarian, like that of the Jews, but remained so only for a short space of time; that the first adulteration of this doctrine proceeded from a mixture insensibly formed by the ideas of the Gnostics, who appeared, as we know, in the time of the Apostles, and who introduced into the west the principle of the Indian philosophy, that God, in the formation of the world, made use of intermediary agents; that, on the other hand, the Greek philosophy, in alliance with Christianity, personified the word, which, in the opinion of Plato and Christian Platonists, was no more than an abstract quality, an attribute, an act of the divinity; that the desire of doing greater honour to the legislator of the Christians, without too much changing the fundamental dogma of the unity of God, induced them to identify, with the person of Jesus, those imaginary beings; that, from this intermediate agency of the Gnostics, Arianism particularly sprang, whilst from the personification of the word resulted the consubstantiality of Athanasius and of the fathers of Nice, and, of consequence, the dogma of the Trinity.

Priestley was no less singular in the metaphysical part of his belief. True metaphysics in modern times have demonstrated, that it is as impossible for a thinking substance to know by itself its proper nature, as for the eye to see itself; because, for the purpose of contemplation, it would be necessary that it should go out of itself, and form a comparison with other beings; whilst, on the contrary, it is only in itself, or in its proper modifications, that it sees, or believes it sees them.

Priestley was either ignorant of those results, or had not examined them. According to him, the Scriptures and experience agree to form a material soul: the fibres of the brain are the depositaries of the images produced by the senses; the power which those fibres have of mutually exciting their vibrations, is the cause of the association of ideas. Mind perishes with the body, but it will again be re-produced on the day of the resurrection, in virtue of the will and the power of God. Till that period, we shall repose in absolute sleep; the distribution of rewards and punishments then only awaits us.

A material soul is submitted to the necessary empire of exterior agents: there is no free-will, but absolute necessity in all our determinations. Why then, say they to him, rewards and punishments? It is precisely that we may have this determining cause in favour of virtue. We may then well suppose, he did not believe in the eternity of punishments.

It must be observed, that many of these dogmas, are those of the first Socinians, and that Priestley has done no more than support them with new arguments.

I have, doubtless, no need to decide on questions so often discussed, and so foreign to those studies which assemble us together. But it is my duty to mention that Priestley supported them but too ably: his adversaries themselves acknowledged his vast erudition, and his dextrous art in the combination and direction of his arguments: they unanimously speak of him as the ablest disputant of modern times, and one of the most dangerous enemies of the orthodox creed.

In the Catholic church, where authority alone is the judge of faith, writers of this kind are no longer formidable; for writings contrary to its dogmas remain unknown to the faithful. But in a Protestant country, where every thing is submitted to argumentation, there exists continually a species of intestine war: theologians are always

in arms: the empire of mind is a charm which is continually present to their ambition, and in which dialectics may yet make great conquests. It was that which apparently tempted Priestley, and who would not pardon him? Authority is so bewitching, and that of which persuasion alone is the instrument, appears so pleasant!

Perhaps he had also the weakness to think, that in times of incredulity, it is necessary to lighten faith, as during a storm, we clear the ship of the grosser part of her cargo. In effect, one would believe that, in rejecting so many tenets, he had only one step to make, to fall into absolute incredulity; but farther he did not advance: on the contrary, in theology, as in physics, he wished to be at his post, how perilous soever it might be, and trusted to his courage to defend it.* He could not suffer any person to stay behind, or to proceed farther than himself. Thus he attacked the orthodox, and repulsed the incredulous; and scarcely did there appear a publication in Europe, which seemed in the least directed either against revelation in general, or against his manner of explaining it in particular, that he did not think himself obliged to refute.

In this species of war, his activity knew no bounds: Atheists, Deists, Jews, Arians, Quakers, Methodists, Calvanists, Episcopalians and Catholics, he equally combatted. He has written against each of those particular creeds; and I would have difficulty in arriving at a conclusion, if I were only to mention their titles.

A proof of his having performed all this with good faith is, that he believed, that from the Scriptures, he could predict future events. Prophets who are not inspired, make predictions of a long term, that they may not be ridiculed during their lives.

Priestley, persuaded of the truth of this faculty, in 1799, published an address to the Jews, in which, according to the revelation of Daniel and St. John, he announced their approaching re-establishment in Palestine, the reunion of all sects, and the commencement of the reign of glory. Besides his calculation of years, which had some relation to the commencement of the 19th century, the symptoms of this great event were to be the destruction of Papal power, the overthrow of the Turkish Empire, and the kingdoms of Europe. The French monarchy, said he, which appeared so solid, has fallen, others will quickly follow: the Pope is dethroned and exiled: and the Turk subsists only by the sympathy of his neighbours. He himself lived to see some of those symptoms vanish.

I would, gentlemen, have disguised a part of these extraordinary details, if our *eloge* were not historical; if it were not prescribed to speak for, and against the character, as expressly ordained by the first and most illustrious of our predecessors.

Besides, is there not also some utility in seeing, by facts, to what length the best minds may suffer themselves to be drawn away, when they forsake those limits which Providence has marked out for the human understanding?

The wanderings of so noble a genius are a better safeguard than real misfortunes; for where is the generous man, who would not be willing to endure still greater hardships, if he were sure of announcing the truth, and promoting happiness?

It was not precisely the theology of Priestley which won the affections of his friends, and excited the hatred of his enemies, for, in England, the right of dogmatizing is common to all—but a system of politics which was closely connected with his theology; I mean the politics of Dissenters, which are almost always those of the opposition.

In France, it was believed, that Protestants were republicans by religion; they were so by oppression. In Ireland, the Catholics have this character, and the Protestants, who domineer over them, are royalists, becaue the king is of their party.

* The French writer, with all his prejudices against the system of Priestley, is yet more candid than many of the Doctor's country-men. For they have often charged him with a disbelief of Christianity, because he did not believe exactly as much as they did. Cuvier more fairly bears testimony to Dr. Priestley's adherence to the cause of revelation, although he explained it in a manner different from some others. E.M.M.

This natural opposition is, in England, more violent than elsewhere, precisely because the Dissenters are half tolerated, and only half. There, they are far removed from places of honour or of profit they are rigorously compelled to pay tithes for the support of a worship not their own: their children are not even admitted into the national university, and, in the mean time, they are numerous and wealthy: they assemble, they speak, they publish, and enjoy all the means of increasing their resentment..

Priestley, during thirty years, was their most eloquent organ, and we may say, the boldest pleader in their behalf. Twenty volumes on this subject have issued from his pen. In this sense only he wrote against those famous letters of Edmund Burke, in which the latter predicted, in a manner so frightful and so true, the miseries which were to result from the French revolution. Apparently they did not well understand, in Paris, the object of this answer of Priestley, for it was the means of admitting him to the rank of French citizen, and member of the convention, two titles which then did not seem very suitable to so ardent a defender of revelation, and universal toleration. In the mean time, he made use of the first, but eluded the exercise of the second, under the pretext that he had not a sufficient acquaintance with the French language.

Without pronouncing decisively on this point, I would observe, that the political writings of Priestley unite a rare moderation in terms, to a loyalty in sentiment, not less rare.

He demands nothing for the Protestant Dissenters which he does not equally demand for the Catholics, and even with more force, because they suffer more. No Catholic has painted more lively than he the oppression under which nine tenths of the people of Ireland have long groaned.

I know not whether the Catholics were much attached to a Unitarian for these efforts in their favour; but it is easy to conceive, that the extension of his benevolence was not fitted for a reconciliation with those of the English pale; for the hatred of the high church was almost wholly directed against his person: all who wrote against him were sure of a rich reward; many of them had even bishopricks conferred upon them, which made him say (in pleasantry) that it was he who held the list of of the benefices of England. But the aversion which he inspired, was not bounded by lawful means, and it appears but too true, that the writings and fanatical sermons of some episcopal ministers, contributed to create those vexations of which he was the victim.

It was at that epoch when the commencement of the French Revolution had not divided France only, but all the states, and towns, and I may say, all the families of Europe.

The war was then confined to France, but they disputed in all countries; and a singular thing it was, that among nations the most free, they showed the greatest ardour for revolution. It was at a moment When the British government saw no other resource, than in those means which then served so well the purpose of the enemies of the government of France. Those who were *revolutionists, or who were considered* as such, were assailed by a mob.

One of the most terrible was that of Birmingham of the 14th of July, 1791. Some individuals of different sects, among whom were also Bishops, celebrated a banquet in honour of our revolution.* It was published abroad, that Priestley was the promoter of this *fête*: billets of invitation, couched in the most seditious terms, were forged, and attributed to him. It was declared, that the most absurd or criminal toasts were given, which was boldly contradicted by those who were present.

An enraged populace assembles from all quarters; calumny circulates and increases; there is no horror of which the guests are not accused.—

* There appears some inaccuracy in this statement. No Bishops attended the *fête* at Birmingham. Dr. Priestley himself speaks "of the celebration of the anniversary of the French revolution, by several of his friends, but with which he had little to do."

B.M.M.

The house, in which they were assembled, is attacked, broken open, and desolated: the furious multitude only repeats the name of Priestley; he is a dissenting minister, the chief of revolutionists; on him the hatred of Englishmen has long been concentered: now is the moment for revenge!

The unfortunate old man was so much a stranger to what was imputed to him, on this occasion, that he knew not even what took place in the town, and had not been present at the feast; but the seditious troop listen to nothing: they suppose he has escaped; supplied with torches, and all the instruments of destruction, they fly to his house.

It was a modest country seat, the fruit of the savings of his frugality, situated at the distance of half a mile from the town: there he lived, with his wife and two sons, in all the simplicity of ancient manners. It was there he had received the homage of so many travellers, illustrious by their birth or by their fortune, who were unwilling to quit England without being acquainted with this great man. It was there where, during eleven years, his hours were divided between the study of the sciences, the education of youth, and the exercise of charity, the principal duty of his ministry.

His place exhibited an incomparable ornament, and only one; this was the immense collection of instruments, most of which were invented, or constructed by himself; the storehouse from which issued so many new truths, so many discoveries, useful to those frantick people themselves; for almost all were artizans of Birmingham, and among the numerous manufactures in this town, there is scarcely one, the process of which has not been improved by the discoveries of Priestley.

But against the spirit of party what can gratitude perform? Does a *mob* know any thing of his services in this line? All is reduced to dust!—The apparatus in use for many months, and which was to resolve important questions, was immediately destroyed; the registers of observations, kept during many years, were delivered to the flames; half finished works, a considerable collection of books, with notes, additions, and commentaries, underwent the same fate. In a few minutes, the whole house was burned or razed to the ground.

How frightful was the moment!—An old man, in his seventieth year,* sees in an instant extinguished that which had been procured by fifty years of assiduity, and the economy of a whole life; not his moderate fortune, for that was nothing; but the work of his hands, the conceptions of his mind; all that he reserved of thought and experience for the meditation of the remainder of his days. His family, whom he had conducted to some distance from the approach of the mob, were still gazing at this horrible spectacle.

The tumult lasted during three days, and the houses of his friends experienced the fate of his. As it always happens, it was the victims who were accused, and the journals failed not to announce, that among the papers of Priestley were found proofs of a great conspiracy.

This calumny was sufficiently refuted by his publick residence, during two years, in the dissenters' college of Hackney, near London, where he gave lessons on chemistry, and as minister, occupied the place of the celebrated Dr. Price. He could at all times, have been brought to justice, and their benevolence would not have prevented this, if the least proof could have been produced against him.

They contented themselves with painting him in the most frightful colours, in periodical writings, and political pamphlets. There are few examples of so violent a hatred;—and such animosity against a man who was so great an honour to England, would be inexplicable, if during fifteen years, we were not furnished with many examples of the influence of the spirit of party in poisoning every opinion; if fifteen centuries had not evinced, to what degree of fury, accusations may be carried, when the pretext is sacred.

* At the time of the riots, he was only in his 59th year. B.M.M.

There was nothing personal in his character which could draw upon him such vengeance; his controversies had no influence over his feelings, and as a proof of this, it may be observed, that although they often wrote against each other, he and Dr. Price were always friends.

Far from having any thing in his manners that was proud or turbulent, he showed, in his conversation all the modesty of his writings; and nothing was more easy or common to him than these words—*I know not;* a phrase which few of those, whose profession is literature, know how to pronounce. His physiognomy bore more the impression of melancholy than of inquietude, and he was not averse to the society of a few friends, nor to the pleasant gaiety of open conversation. This man, so profound in many branches of science, passed several hours every day in instructing children. This was the occupation with which he was always most pleased, and his scholars venerated him with a filial tenderness, many of them even with genuine enthusiasm.

But he was arrested by no consideration when he thought he had some truth to defend, and this trait of character, so respectable in itself, extinguished the effect of his amiable qualities, and proved the torment of his life; because he pursued it to an extreme, because he forgot, that reason is but the least of those means which are necessary for the reception of opinions, that attack the habits, or the momentary interests of men.

The insults heaped upon him, and the fear of again endangering the life and fortune of his friends, made his residence, in his native country intolerable. His new establishment at Hackney, where by patience and industry he had already repaired a part of the disasters at Birmingham, could no longer retain him; and to come to France, during a state of war, would have justified all the imputations of his enemies: he could anticipate no repose but in the United States of America, and some time elapsed, before he found it there: English prejudices pursued him across the seas, and till the event of the election of Mr. Jefferson to the Presidency of the United States, he was not without fear of being forced to abandon that asylum.

The dedication of his *Church History* to this great magistrate, in gratitude for the tranquillity he enjoyed, and the answer of Mr. Jefferson, offer the finest models of friendly relations which may exist between men of letters and statesmen, without disparaging either.

Priestley proposed to consecrate the rest of his life to this work, in which he could combine, in one whole, the developements and proofs of his theological opinions; but he was stopt in his fourth volume, by a fatal accident.* His aliment was one day, by unknown means poisoned; all his family were in danger, and himself, from that period, did nought but languish. After three years of suffering, a gradual decay terminated his days.

His last moments were filled up with the overflowings of that piety which had animated all the former part of his life, and which, because it was not well regulated, was the cause of all its errors. He heard the scriptures read, and thanked God for having given him a useful life, and a peaceable death. He placed in the list of the principal benefits he received from the Supreme Being, that of being personally acquainted with almost all his celebrated contemporaries. *I go to sleep like you,* said he to his grand-children, whom they were conducting to their repose; *but,* added he, looking at the bye-standers, *we shall awake together, and I hope, for the enjoyment of eternal happiness;* thus giving another testimony to the sincerity of the belief in which he died. These were his last words.

Such was the end of a man, whom his enemies long accused of plan-

* This relation is probably a mistake. In the continuation of the Memoirs of his life by his son, no mention is made of it. He speaks of his having a violent attack of fever at Philadelphia in the Spring of 1801, which weakened him considerably. Indigestion followed, and increased to the period of his death, which was supposed to have been occasioned by a stoppage in the œsophagus B.M.M.

ning the destruction of all religion, and morality, and whose greatest error was in forgetting his vocation, and in attaching too much importance to particular opinions on subjects, concerning which the most important of all sentiments, is the love of peace.*

DISCOVERIES AND IMPROVEMENTS IN ARTS, MANUFACTURES, &c.

Patent of Messrs. Phillip Londen, sen. and jun. of Chelsea, for new and improved methods of manufacturing Muriate of Soda, or common salt, dated April, 1809.

THE specification of this patent states the new method of manufacturing sea salt, to consist in purifying rock salt, or that obtained from brine springs, sea water, &c. by fusion and calcination; and by the application of soda, its nitrate, sulphate, or carbonate, or any other of its combinations; potash, volatile alkali, lime, or their sulphates, nitrates, carbonates, or their other combinations; or by the addition of any other material or re-agents, that will effect the decomposition, precipitation, or separation of the whole or part of the earths and metals, or earthy or metallic salts, combined with the muriate of soda; which re-agents, or any of them, we apply, at any part of the processes hereafter mentioned, as circumstances may require.

The sea salt, with the necessary re-agents and materials, is to be put into a reverboratory furnace, or into any suitable vessel, and brought to a state of fusion, and kept so for a sufficient time, so that the earthy and metallic parts may be precipitated, or separated. The salt is then drawn off into proper vessels as long as it continues to come off fit and clear (or it may remain in the furnace to cool) leaving the sediment of the precipitated, earthy, and metallic matter, with some muriate of Soda. Afterwards the salt, so purified, may be broken into grains for common use. This process may be managed so as to produce salt of any inferior degree of purity, by properly regulating the heat. The salt remaining, with the impure residue, may be recovered by solution and evaporation; or where less purity is required, calcination alone may be employed, and the salt afterwards be farther refined by solution and evaporation.

The salt refined in this manner, the patentee asserts, will be purer, and more fit for curing fish and provisions, and for common use, than any small salt at present manufactured; and that its use may supercede the necessity of importing any foreign bay salt altogether.

Observations. The specification of this patent is an instance of obscurity, either effected for the unjust purpose of concealing the process, or ignorantly incurred by attempting to monopolize every possible method of applying it. Patentees, by attempts, such as this, at steering along the very utmost limits of law, frequently defeat their designs,

* Had such timid counsels prevailed with the reformers of the various ages, the work of reformation and of approximation towards truth, would not have advanced; and an error once adopted would never be eradicated. In metaphysical and theological investigations much may remain to elude the strictest research; but many advances may be made in this knowledge if mankind were as much engaged in the discovery of religious, as other truth. They who would not trust another to make a bargain for them by which their pecuniary interests might be endangered, will yet confide implicitly in the opinion of others in religion; and, adopting a traditionary belief, surrender our noble privilege to examine. Cuvier through the entire of this sketch, so interesting, and truly liberal, in other respects adopts the plan, of submiting to authority in matters of religion.

E.M.M.